

CLAIMS

What is claimed is:

1. An assembly comprising:
  - a printed circuit board comprising a conductor, the conductor having a characteristic impedance;
  - an integrated circuit die having an output driver, the output driver having an output impedance;
  - an integrated circuit package having an inside surface;
  - and
  - an interposer disposed in the integrated circuit package between the integrated circuit and the inside surface of the integrated circuit package, wherein a signal path extends from the output driver, through the interposer, through the package, and to the conductor of the printed circuit board, the signal path exhibiting an intervening impedance, wherein the output impedance of the output driver plus the intervening impedance of the signal path substantially equals the characteristic impedance of the conductor of the printed circuit board.
2. The assembly of claim 1, wherein the interposer includes a DC load structure, the DC load structure having an impedance, the impedance of the DC load structure being a part of the intervening impedance.
3. The assembly of claim 2, wherein the interposer includes a node disposed in the signal path, a supply voltage node, and a ground node, and wherein the DC load structure includes a first resistor coupled between the node in the signal path and the supply voltage node, and wherein the DC load structure further includes a second resistor coupled between the node in the signal path and the ground node.

4. The assembly of claim 1, wherein the interposer includes an AC load structure, the AC load structure having an impedance, the impedance of the AC load structure being a part of the intervening impedance.
5. The assembly of claim 4, wherein the interposer includes a node disposed in the signal path and an AC ground node, and wherein the AC load structure includes a resistor and a capacitor coupled in series between the node in the signal path and the AC ground node.
6. The assembly of claim 1, wherein the integrated circuit includes a micro-bump, and wherein the output driver is coupled through the micro-bump to the interposer.
7. The assembly of claim 1, wherein the interposer is a through-hole interposer.
8. The assembly of claim 1, wherein the interposer is a via interposer.
9. The assembly of claim 8, wherein the integrated circuit die has a major surface, and wherein the caposer has a major surface, the major surface of the integrated circuit die and the major surface of the interposer having roughly identical surface areas.
10. The assembly of claim 1, wherein the interposer includes no transistor and no PN junction.
11. The assembly of claim 1, wherein the interposer includes a layer comprising epoxy and fiberglass.
12. The assembly of claim 1, wherein the interposer includes a layer of resistive material, wherein a portion of the layer of resistive material is a resistor, the resistor having a

resistance, and wherein the impedance of the intervening impedance depends at least in part on the resistance of the resistor.

13. The assembly of claim 1, wherein the interposer includes a first conductive layer and a second conductive layer, the first and second conductive layers constituting a capacitor, the capacitor having a capacitance, and wherein the impedance of the intervening impedance depends at least in part on the capacitance of the capacitor.

14. The assembly of claim 1, wherein the interposer comprises a micro-bump, the interposer being coupled to the inside surface of the integrated circuit package by the micro-bump.

15. A method of impedance matching an output driver of an integrated circuit die to a printed circuit board conductor, the output driver exhibiting an output impedance, the printed circuit board conductor exhibiting a characteristic impedance, the method comprising:

providing an interposer in a signal path, wherein the signal path extends from the output driver and to the printed circuit board conductor, wherein the signal path from the output driver to the printed circuit board conductor exhibits an intervening impedance, wherein the output impedance plus the intervening impedance is substantially equal to the characteristic impedance, the interposer being disposed inside an integrated circuit package between the integrated circuit die and an inside surface of the integrated circuit package.

16. The method of claim 15, wherein the integrated circuit die has a micro-bump, the integrated circuit die being physically attached to the interposer by the micro-bump of the integrated circuit die, and wherein the interposer has a

micro-bump, the interposer being physically attached to the integrated circuit package by the micro-bump of the interposer.

17. The method of claim 16, wherein the caposer has a planar form and is less than 100 microns thick.

18. An assembly, comprising:

an integrated circuit die having a micro-bump and an output driver, the output driver exhibiting an output impedance;

an integrated circuit package containing the integrated circuit die;

a conductor disposed outside the integrated circuit package, the conductor exhibiting a characteristic impedance; and

means for inserting an impedance into a signal path between the output driver and the conductor, the means being physically attached to the integrated circuit die by the micro-bump of the integrated circuit die, the means including a micro-bump that physically attaches the means to the integrated circuit package.

19. The assembly of claim 18, wherein the signal path between the output driver and the conductor exhibits an intervening impedance, and wherein the intervening impedance plus the output impedance is substantially equal to the characteristic impedance.

20. The assembly of claim 19, wherein the means includes no transistor and no PN junction.